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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/821,732	03/30/2001	Yukio Hemmi	016887/1038	5467
22428	7590	05/24/2004	EXAMINER	
FOLEY AND LARDNER SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			KEITH, JACK W	
			ART UNIT	PAPER NUMBER
			3641	

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/821,732

Applicant(s)

HEMMI ET AL.

Examiner

Jack W. Keith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13, 14, 16-18 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) 6-8, 10, 11, 13, 14 and 16-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9, 24-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Request for Continued Examination*

1. The request filed on 2/25/2004 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/821,732] is acceptable and a RCE has been established. An action on the RCE follows.

### *Response to Arguments*

2. Applicant's arguments filed 2/25/2004 have been fully considered.

With regard to the outstanding 112, first and second paragraph rejection applicant argues that (per specification support) that  $\text{TiO}_2$  as disclosed in the specification has an ion exchange and/or superhydrophilic property. Applicant further emphasizes (per specification support) that  $\text{TiO}_2$  shows a superhigh hydrophilic property when in combination with an  $\text{SiO}_2$  binder. Applicant further asserts that it is not known that  $\text{TiO}_2$  alone exhibits a superhigh hydrophilic property and therefore applicant's disclosure cannot be used as the basis for the teaching of  $\text{TiO}_2$  only as being a superhigh hydrophilic material.

Applicant on page 9, paragraph 4 asserts that  $\text{SiO}_2$  is not an essential or critical element to the practice of the invention.

With regard to the outstanding 102 and 103 rejection applicant argues that the primary reference of Skarpelos does not set forth a structure adapted to trap thereon

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radioactive corrosion products contained in water droplets so that the radioactive corrosion products firmly adhere to the surface of the structure.

Referring to page 7-8, lines 22-12 of the specification:

TiO<sub>2</sub> has an ion exchanging ability and/or a superhigh hydrophilic property. TiO<sub>2</sub> is used as an ion-exchange material at high temperatures. It is generally known that TiO<sub>2</sub> shows a superhigh hydrophilic property when it is used in combination with an SiO<sub>2</sub> binder. When the surfaces of the corrugated plates 22 are coated with a substance having a superhigh hydrophilic property, liquid drops fallen on the corrugated plates 22 spread over the surfaces of the corrugated plates 22 in thin liquid films. Such thin liquid films are difficult to separate from the surfaces of the corrugated plates by shearing force exerted thereon by steam stream. Corrosion products contained in the liquid drops adhere firmly in flat films to the surfaces of the corrugated plates 22 after the liquid drops fallen on the surfaces of the corrugated plates 22 have dried up.

Since TiO<sub>2</sub> has an ion exchanging ability, the surfaces coated with TiO<sub>2</sub> of the corrugated plates 22 are able to catch particles of radioactive materials. Thus, radioactive materials deposit on the corrugated plates 22 in ionized corrosion products and adhere firmly to the surfaces of the corrugated plates 22. Radioactive materials thus deposited on the corrugated plates 22 are difficult to separate from the corrugated plates 22. Principal radioactive materials such as, <sup>60</sup>Co, <sup>58</sup>Co and <sup>54</sup>Mn that migrate to the steam system exist in ions in the reactor water. Therefore coating the surfaces of the corrugated plates 22 with TiO<sub>2</sub> is effective. Ferrite and ZrO<sub>2</sub> have an ion exchanging ability as well as TiO<sub>2</sub>.

Note that the specification sets forth that surfaces coated with TiO<sub>2</sub> are able to catch particles of radioactive material. MPEP § 2112 sets forth when a reference teaching a product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending to show inherency, the burden shifts to the applicant to show an unobvious difference.

Within the rejections Skarpelos sets forth a structure capable of meeting applicant's claimed inventive concept. A dryer coated with a superhydrophilic material (TiO<sub>2</sub>). Clearly as set forth by applicant's own definition of superhydrophilic and the material TiO<sub>2</sub> being a superhydrophilic material the rejection of Skarpelos is proper. A similar structure must inherently possess the same characteristics. Furthermore as set forth by applicant the binder material (SiO<sub>2</sub>) is not essential to the practice of the

invention. Thus, applicant must know that  $\text{TiO}_2$  alone possesses the necessary superhydrophilic properties.

It appears from the specification and applicant's arguments that he is contradicting himself. That is on one hand  $\text{TiO}_2$  only possesses the superhydrophilic property, but on the other hand does not. This being the case it appears that some critical or essential feature (other than the binder as by applicant's admission the binder is not critical), making applicant's invention capable of being able to trap particles of radioactive material and the invention of Skarpelos being the same or similar, is missing from applicant's disclosure. Thus the best mode for practicing the invention is not set forth in the original disclosure. A new 112, first paragraph rejection regarding best mode is presented below.

Note that applicant must prove that the structure of Skarpelos is not capable of meeting the claimed inventive concept (see MPEP § 2112).

The rejections of paper no. 17 have been revised below to include the addition and cancellation of claims.

***Claim Rejections - 35 USC 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-5, 9, and 24-27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as

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to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As addressed above applicant argues that  $\text{TiO}_2$  alone is not a Superhydrophilic substance. Applicant further asserts that the binder  $\text{SiO}_2$  is not critical to the invention. Thus, for applicant's invention to be different from that of Skarpelos some critical or essential feature must be missing thereby enabling applicant's invention to function different to that of the identical structure of Skarpelos. Thus the disclosure is not enabled. It would appear that undue experimentation on the skilled artisans part is required to the practice of the invention.

5. Claims 1-5, 9 and 24-27 are rejected under 35 U.S.C. 112, first paragraph, because the best mode contemplated by the inventor has not been disclosed. Evidence of concealment of the best mode is based upon applicant's assertion that  $\text{TiO}_2$  alone is not a Superhydrophilic and that an  $\text{SiO}_2$  binder is not critical or essential to the invention. As above some critical or essential feature is missing from applicant's disclosure which enables his invention to function as claimed, but the identical structure of Skarpelos having the same structure disclosed by applicant (as alleged by applicant) fails to function the same.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-5, 9 and 24-27 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

Evidence that claim fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in Paper No. 16 filed 7/17/2003 and the Paper dated 2/25/2004. In that paper, applicant has stated it is not known if  $\text{TiO}_2$  alone is a Superhydrophilic substance, nor is a binder material critical to the invention. Thus, these statements indicate that the invention is different from what is defined in the claims.

8. Claims 1-5, 9 and 24-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claims 1-3 - particularly claim 1 recites the limitation "water drops". In the nuclear environment steam does not inherently possess water droplets. Water droplets entrained in steam represent a hazard to downstream components such as steam turbines. Carry-over of said steam/water droplets damages turbine blading and is thus not desirable from an operational standpoint or an economical standpoint (i.e., system damage, power outage, etc.). The water droplets in question here are from condensation of the steam on the radioactive material separating device, not from the steam passing through the pressure vessel or turbine.

b. Claims 1-5, 9 and 24-27 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are critical or essential materials required for the Superhydrophilic substance to function as set forth by applicant to define over the identical structure of Skarpelos.

***Claim Rejections - 35 USC 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-5 and 24-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Skarpelos et al (5,028,384).

Skarpelos discloses a structure inherently capable of meeting applicant's claimed inventive concept. A nuclear reactor power plant employing a reactor (14), a steam turbine (24) and a radioactive material separating and removing apparatus (20) located inside the reactor pressure vessel. Skarpelos further discloses that the radioactive material separating device or steam dryer is coated with  $\text{TiO}_2$  and/or  $\text{ZrO}_2$  (i.e., metal oxide).  $\text{TiO}_2$  as set forth by applicant (see specification page 7, ln 24+) is a known Superhydrophilic substance.

Statements of intended use or field of use, "adapted to", "adapted for" or "capable of" clauses are essentially method limitations or statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See In re Pearson, 181 USPQ 641; In re Yanush, 177 USPQ 705; In re Finsterwalder, 168



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USPQ 530; In re Casey, 512 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647.

See MPEP ' 2114 which states:

A claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus@ if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ 2nd 1647

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. In re Danly, 120 USPQ 528, 531.

Apparatus claims cover what a device is not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

As set forth in MPEP § 2115, a recitation in a claim to the material or article worked upon (i.e., steam or water droplets) does not serve to limit an apparatus claim.

As to limitations which are considered to be inherent in a reference, note the case law of In re Ludtke, 169 U.S.P.Q. 563; In re Swinehart, 169 U.S.P.Q. 226; In re Fitzgerald, 205 U.S.P.Q. 594; In re Best et al, 195 U.S.P.Q. 430; and In re Brown, 173 U.S.P.Q. 685, 688.

See figure 1 and columns 1-2, lns 60-16; column 4, lns 56-68 and column 5, lns 1-23.

### ***Claim Rejections - 35 USC 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-5 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skarpelos et al ('384) in combination with the admitted prior art (specification page 7, ln 24+) or Zeng et al (JP 11-285635) and Hayakawa et al (WO 96/29375).

Skarpelos discloses applicant's inventive concept; however, if not apparent that Skarpelos sets forth an operable Superhydrophilic substance ( $\text{TiO}_2/\text{ZrO}_2$ ) then applicant admits (see specification page 7, ln 24+) Superhydrophilic substance utilizing  $\text{TiO}_2$  in combination with a binder are well known.

Zhang (see US equivalent 6,217,999) further teaches a known prior art Superhydrophilic substance via Hayakawa et al (WO 96/29375) utilizing a binder material  $\text{SiO}_2$  in association with  $\text{TiO}_2$ .

Accordingly, modification of Skarpelos to have included the known Superhydrophilic substance teachings (i.e., incorporation of a binder material) would have been obvious to one having ordinary skill in the art at the time the invention was made as such results are in no more than the use of conventionally known materials/designs available within the art as is evident by the admission by applicant or the teachings of Zeng and Hayakawa.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Skarpelos et al ('384) as applied to claims 1-5 and 24-27 above, and further in view of Cowan II et al (5,465,278).

As set forth above Skarpelos discloses applicant's inventive concept; however, from the figure of Skarpelos it is not clear if the steam dryer (20) (radioactive material separating device) is corrugated.

Referring to figure 1 of Cowan II et al ('278) one can clearly see that steam dryer located within the pressure vessel are corrugated. Accordingly, having a corrugated steam dryer is known within the art, such would be advantageous within Skarpelos reactor in order to increase the exposed surface area of radioactive material separating device. Additionally, substitution of one steam dryer for another type would have been obvious to one having ordinary skill in the art.

Regarding claim 9 - product by the process - the patentability of a product does not depend on its method of production. If the product (corrugated plates) in the product by process claim is the same as the prior art, the claim is unpatentable even though the prior art product was made by a different process. See In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Also see MPEP § 2113.

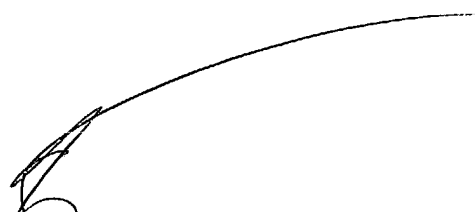
Accordingly, the process of coating the steam dryer in Skarpelos meets applicant's claimed inventive concept.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack W. Keith whose telephone number is (703) 306-5752. The examiner can normally be reached on Monday-Thursday 6:30-5 p.m., with Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on (703) 306-4198. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jack W. Keith  
Primary Examiner  
Art Unit 3641

jwk  
May 18, 2004